Killer Hardware Tips

A Sweetly Silent PC, Wavering On Wireless & Giving Newton A New Life

IF YOU'RE A USER WHO CAN'T LEAVE THINGS ALONE IF THERE'S A CHANCE YOU CAN MAKE THEM BETTER, EVEN IF IT MEANS BUCKING THE NORM, READ ON. WE HAVE SOME TIPS and tricks that just might make you more productive.

Shhhhhhhh!

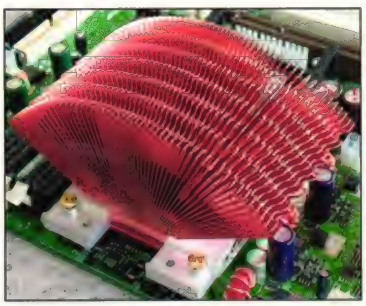
With a press of a button, your PC powers up, and a din like a jumbo jet barreling down the runway replaces the quiet serenity of your home or office. Most PCs are fairly loud due to whirring fans and spinning drives. An overclocked PC—for which cooling is especially critical—is often most offensive to the ears.

Many of us make our PCs faster or prettier, but few of us concentrate on making them quieter. Carl Nelson, however, built a near-silent PC. He documented the experience at www.hardcoreware.net/reviews/other/silent_pc/1.php. Nelson says the project lowered his PC's sound level to 1/20th of its original intensity, from 66dBs (a level between normal conversation and busy street traffic) to 45dBs (slightly louder than a refrigerator humming).

"My theory of building a silent PC is to build one that is as quiet as possible, but at the same time does not sacrifice speed or looks," Nelson says. Nelson's machine uses a 2.8GHz Pentium 4 and an overclocked video card, both running without fans. (The PC's only fan cools the power supply.)

This is the biggest secret to reducing noise: Replace fans with passive heatsinks, which dissipate heat without moving parts. Nelson used passive heatsinks on the CPU and video processor. Although both ran slightly hotter than with active heatsinks (or fans), both were within the limitations of the hardware.

The principal risk in making a super-quiet PC is heat; it's important to test components to make sure they're not sweltering. "Having everything on a PC running beyond specified heat levels for a long period of time may contribute to lower lifespan of components," Nelson says. His goal is to keep components within the recommended thermal spec while keeping the noise down. You can accomplish this by using specialty products from such manufacturers as Zalman and Thermaltake.



The Zalman CNPS6500A-Cu looks like a modern art installation, but it is actually a fanless copper heatsink.

Because of the heat issue, overclocking and silence usually don't go hand in hand. "It really depends on what you are trying to overclock and how far you are trying to take it," Nelson says. "I had a GeForce4 Ti 4200 running just as fast with a passive heatsink as I did with the big stock heatsink-fan unit. However, there is no way I would recommend someone try something like that with their Athlon XP processor."

In addition to passive heatsinks, Nelson's system keeps things hush-hush via a power supply with a near-silent fan, a hard drive with acoustic management functions, and a large case to maximize airflow. Other available sound-quenching devices include drive enclosures, sealed PC cases, and sound-dampening materials. Check out Silicon Acoustics.com and Quietpc.ca for such products.

To make your PC significantly quieter without going whole-hog, just replace the single loudest component. "For most people, especially AMD users, this is the CPU heatsink-fan unit," Nelson says. "OEM heatsink fans are usually small fans spinning at a very high speed to keep those Athlon XPs cool. Intel's cooler for their Pentium 4s are very quiet to begin with," he adds.

The next loudest component on most systems is the power supply fan. Several companies, including Antec, Enermax, and Thermaltake, offer quiet replacement power supplies.

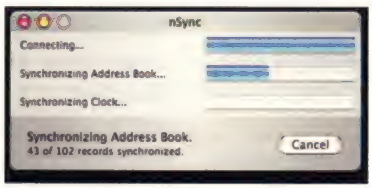
A larger, lower-RPM fan can move the same amount of air (or more) as a smaller, high-RPM fan usually associated with performance cooling. Many fans have variable speeds, either controlled by the user or relative to temperature. "I recently replaced a friend's stock heatsink with a Thermaltake Volcano 9," Nelson says. "The fan will only spin as fast as it needs to in order to keep the CPU cool. I actually added two more low-RPM fans to his system to further improve airflow, and it is still quieter than it was before."

More information about computer acoustics is available at Silent PC Review, a site dedicated to reviews, news, and information about quiet computers and components.

The Future Of Wi-Fi

Now that new wireless networking standards are on the horizon, is your 802.11b network obsolete? "It's definitely not obsolete because the newer technologies will either be backwards compatible or have a variety of limitations in terms of distance and compatibility that might not make it appropriate as a replacement," says Glenn Fleishman, author of the 802.11b Networking News blog (80211b.weblogger.com).

Nonetheless, new protocols have advantages that may make you want to upgrade. The two next-gen wireless standards that are competing for dollars and airtime are 802.11a and 802.11g. 802.11g promises to deliver up to 54Mbps of throughput and will be backwards compatible with existing 802.11b networks. The protocol is due for ratification by summer, but manufacturers will likely start shipping equipment that is upgradeable to 802.11g by spring. 802.11a, which several vendors are now shipping, also works at 54Mbps (future versions may zoom along at 108Mbps) but isn't compatible with 802.11b.



NewtSync moves your address book and to-do list between your Mac and Newton.

"802.11a has more spectrum available to it, so it has eight nonoverlapping channels for indoor use and four for outdoor use. You can put out a little more power on outdoor use, which could allow you to have high-speed, long-distance point-to-point links that are impossible with b," Fleishman says.

If you want the best of both worlds until the marketplace decides a protocol winner, there is a neutral solution. Several vendors offer cards and access points for 802.11a and 802.11b (simultaneously for access points, one at a time for PC cards).

If the choice between a and g isn't confusing enough, there's yet another option. A variant of 802.11b, which boosts throughput from 11 to 22Mbps, is now available from some manufacturers. "They're using Texas Instruments ACX100 chipset, which implements TI's proprietary Packet Binary Convolution Coding encoding algorithm to produce greater throughput in 2.4GHz. The PBCC algorithm is actually one of the approved encodings for 802.11g, but the way that TI put PBCC into their ACX100 chipsets, they will not be upgradeable to 802.11g," Fleishman says. So if you buy a 22Mbps 2.4GHz access point today, you won't get that speed when using 802.11g devices in the future.

While you're considering all these protocols, keep in mind that the throughput numbers are theoretical. Networking overhead and physical obstacles take a big chunk of your bandwidth. "802.11b is really about 4 to 7Mbps after subtracting overhead. It looks like 802.11a devices at 54Mbps provide about 20-odd Mbps of real-data throughput. I would be surprised if 802.11g topped 20Mbps and wasn't more like 15Mbps," Fleishman says.

Newton, Still Going Strong

The Newton, Apple's foray into PDAs, might have been discontinued in 1998, but it lives on thanks to an active online community. Advocates say that many Newton features—including large screens and handwriting recognition—made it a PDA ahead of its time, and ahead of modern PDAs, too. Legions of Newton users still release hardware upgrades and software add-ons, so if there's a Newton buried in your closet, take it out, dust it off, and put it back to work.

First you'll need software to synchronize data on your Newton with your computer. NewtSync (www.everchanging.com/newton) is a Mac OS X utility that moves data between a Newton and your Mac's address book and calendar apps. The alpha-version software currently works only with a serial connection. Synching via TCP/IP and infrared is planned.

You can also play your MP3s on a Newton. MAD Max (www.40hz.org/MADNewton) plays MP3 files and Icecast and SHOUTcast MP3 streams on Newton MessagePads 2000 and 2100. A special plug-in for iTunes (www.pixell.net/doppler/newton) moves music from your Mac over a serial or Ethernet connection. There are some tradeoffs: It takes two hours to move 20MB of music over a serial connection. To play MP3s on a Newton, the recommended parameters to use are 112Kbps, 22KHz bit rate, mono—not exactly high fidelity. And because the Newton doesn't have a headphone jack, you'll have to add one yourself.

You can also soup up your Newton with an 802.11b wireless card (www.ff.iij4u.or.jp/~ngc/eng/newtwave.htm) and CompactFlash storage (www.kallisys.com/newton/ata). Geeks R Us and Planet Newton have other software, news, and hacks. CPU

by Kevin Savetz

Infinite Loop

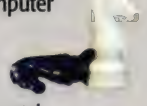
Your Move, Circuit Breath

Think that Quake bot is giving you a headache? Computers are turning chess into a battle of man against machine. Here's a brief look at AI's evolution in the chess world.

1948 Alan Turing creates a chess algorithm for calculating machines (he later commits suicide by eating a cyanide-laced apple).

1988 Carnegie-Mellon University's chess program, Hitech, beats American grandmaster Arnold Denker.

1996 World Champion Gary Kasparov beats IBM's Deep Blue computer 4-2 in a six-game match.



1997 Deep Blue beats Kasparov in a six-game rematch.

2002 27-year-old World Champion Vladimir Kramnik and the German computer Deep Fritz ended an eight-game match in a draw. Kramnik won two games early in the match, and Deep Fritz won two after the break.